MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

T3, 2017/2018

BQA7074 – QUANTITATIVE ANALYSIS

(MBA Full Time)

30 MAY 2018
9.00 a.m – 12.00 p.m
(3 Hours)

INSTRUCTIONS TO STUDENT

1. This Questions paper consists of **SEVEN (7)** pages including the cover page.
2. Answer **ALL** questions. All questions carry equal marks. The marks for each section are given in the question paper.
3. Please write your answers in the **Answer Booklet** provided.

Answer all FIVE questions. All questions carry equal marks. (5x20=100 marks)

Question 1

a. Zaini Brokerage firm has just been instructed by one of its clients to invest RM450,000 of her money obtained recently. The client has a good deal of trust in the investment house but she also has her own ideas about distribution of the funds being invested. In particular, she requests that the firm select whatever stocks and bonds they believe are well rated, but within the following guidelines:

i. Municipal bonds should constitute at least 15% of the investment
ii. At least 45% of the funds should be placed in a combination of electronic firms, aerospace firms and drug manufacturers
iii. No more than 60% of the amount invested in municipal bonds should be placed in a high-risk, high-yield hospital stock

Subject to these restraints, the client's goal is to maximise projected return on investments. The analysts at Zaini, aware of these guidelines, prepare a list of high-quality stocks and bonds and their corresponding rates of return:

Investment	Projected rate of return (%)
Selangor municipal bonds	3.5
Zainal Electronics Shd Bhd	8.6
United Aerospace Corp.	9.4
Sime Drugs	4.8
SLR Hospitals	7.8

I. Formulate this portfolio selection problem using LP

(6 marks)

II. Solve this problem.

(6 marks)

b. Discuss the role of sensitivity analysis in LP. Under what circumstances is it needed and under what conditions do you think it is not necessary?

(8 marks)

Question 2

a. A company is spending RM10000 on transportation of its units from three plants to four distribution centres. The supply and demand of units, with unit cost of transportation are given as:

Continued..

		Distribution centre				Availability
		D1	D2	D3	D4	
Plant	S1	6	8	10	7	375
	S2	7	6	8	9	145
	S3	10	12	8	11	625
	Requirements	525	475	350	275	

What can be the maximum saving by optimal scheduling?

(10 marks)

b. In a job shop operation, four jobs may be performed by any of four operators. The time in minutes required for each operator on each job are presented in the following table. The plant supervisor would like to assign jobs so that the total time is minimised. Find the best solution. Which assignments should be made?

	Jobs			
Operator	J1	J2	J3	J4
P1	82	53	77	64
P2	66	46	58	55
P3	73	62	65	60
P4	76	70	72	72

(10 marks)

Question 3

a. A maintenance project consist of the jobs given in the following table.

Activity	Optimistic time	Most Likely time	Pessimistic time	Predecessor 1	Predecessor 2
A	6	7	8		
B	5	6	7	A	
C	6	7	8	A	
D	8	9	12	B	
E	8	9	15	B	C
F	6	8	9	C	
G	7	8	12	D	E
H	8	12	15	E	F
I	10	12	12	D	G
J	10	15	17	G	H
K	10	12	14	H	
L	8	9	13	I	J
M	9	12	12	J	K

Continued..

i. Draw the network diagram and mark ES, EF, LS & LF.
(4 marks)

ii. Find the critical path, project variance and standard deviation.
(2 marks)

iii. What is the probability of completing the project by 49 and 44 days?
(4 marks)

b. The towns and neighbourhoods in Melaka State are represented by nodes as given in the following table. The distances between towns are shown in kilometres. Find the shortest route from town 1 to town 16. If flooding in cities 7 & 8 force closure of all roads leading into or coming out of those towns, how would this impact the shortest route
(10 marks)

	Start node	**End node**	**Distance (kms)**
Branch 1	1	2	20
Branch 2	1	3	15
Branch 3	1	4	18
Branch 4	2	5	10
Branch 5	2	6	10
Branch 6	3	7	11
Branch 7	4	8	12
Branch 8	5	6	8
Branch 9	5	9	16
Branch 10	6	7	12
Branch 11	6	9	12
Branch 12	7	8	22
Branch 13	7	10	18
Branch 14	7	11	18
Branch 15	8	12	20
Branch 16	9	13	16
Branch 17	10	13	17
Branch 18	11	12	15
Branch 19	11	14	16
Branch 20	12	15	15
Branch 21	13	14	10
Branch 22	13	16	18
Branch 23	14	16	14
Branch 24	15	16	25

Continued..

Question 4

a. An advertising agency has been hired by a manufacturer of digital watches to develop an advertising campaign for the upcoming holiday season. An experiment is designed to compare five different advertisements. A sample of 30 adult respondents, taken from a larger focus group, is randomly assigned to five advertisements. The respondents are permitted to test the watch and plausibility of the advertising copy.

The respondents are then asked to rate the watch from 1 to 7 (lowest to highest) on the product characteristic scales of appearance, durability and performance. The combined scores of three ratings for the 30 respondents are as follows:

Advt. A	Advt. B	Advt. C	Advt. D	Advt. E
9	14	20	19	19
10	14	19	12	17
13	10	17	12	21
11	15	19	18	16
6	7	18	14	17
5	8	15	17	16

i. At the 0.05 level of significance, is there evidence of a difference in the mean rating of the five advertisements?

(5 marks)

ii. If appropriate, determine which advertisements differ in mean yields.

(5 marks)

b. In Johor State, during a period of one month, a random sample of 27 approved policies is selected and the following statistical calculations are made:

Mean processing time : 43.89 days
Std. error: 4.87
Std. deviation 25.28

i. In the past the mean processing time was 45 days. At the 0.05 level of significance, is there evidence that the mean processing time has changed from 45 days?

(5 marks)

Continued..

c. The owner of a gasoline station wants to study gasoline purchasing habits by motorists at his station. He selects a random sample of 60 motorists during a certain week, with the following results:
   - The amount purchased was X-bar = 11.3 gallons, S = 3.1 gallons
   - Eleven motorists purchased premium-grade gasoline

   i. At the 0.05 level of significance, is there evidence that the population mean purchase was different from 10 gallons?

(3 marks)

   ii. Determine the p-value.

(2 marks)

Question 5

The owner of a moving company typically has his most experienced manager predict the total number of labour hours that will be required to complete an upcoming move. This approach has proved useful in the past, but the owner has the business objective of developing a more accurate method of predicting labour hours. In a preliminary effort to provide a more accurate method, the owner has decided to use the number of cubic feet moved and the number of pieces of large furniture as the independent variables and has collected for 36 moves in which the origin and destination were within Kuala Lumpur and travel time was an insignificant portion of the hours worked. The data so collected is as given below.

Hours	Feet	Large	Elevator	Hours	Feet	Large	Elevator
24.00	545	3	Yes	25.00	557	2	Yes
13.50	400	2	Yes	45.00	1028	5	Yes
26.25	562	2	No	29.00	793	4	Yes
25.00	540	2	No	21.00	523	3	Yes
9.00	220	1	Yes	22.00	564	3	Yes
20.00	344	3	Yes	16.50	312	2	Yes
22.00	569	2	Yes	37.00	757	3	No
11.25	340	1	Yes	32.00	600	3	No
50.00	900	6	Yes	34.00	796	3	Yes
12.00	285	1	Yes	25.00	577	3	Yes
38.75	865	4	Yes	31.00	500	4	Yes
40.00	831	4	Yes	24.00	695	3	Yes
19.50	344	3	Yes	40.00	1054	4	Yes
18.00	360	2	Yes	27.00	486	3	Yes
28.00	750	3	Yes	18.00	442	2	Yes
27.00	650	2	Yes	62.50	1249	5	No
21.00	415	2	No	53.75	995	6	Yes
15.00	275	2	Yes	79.50	1397	7	No

Continued...

i. State the multiple linear regression equation and interpret the meaning of b_0, b_1 & b_2.

(4 marks)

ii. Predict labour hours for moving 500 cub.feet with two large pieces of furniture.

(4 marks)

iii. Determine whether there is a significant relationship between labour hours and the two independent variables at 0.05 level of significance.

(4 marks)

iv. Determine the p-value in (iii) and interpret its meaning.

(4 marks)

v. Interpret the meaning for the coefficient of multiple determination r^2 and adjusted r^2.

(4 marks)

End of Paper